Vicon Nexus 2: Calibration Guide
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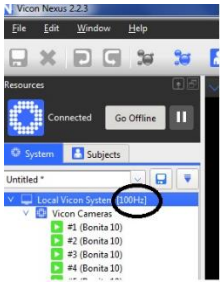


1 Prepare the system for calibration

1.1 Before Calibration:

1.1.1 <u>Default setting should be:</u>

- ✓ You're in the "System" tab
- ✓ That the "Local Vicon System" is at 100Hz
  - *Calibration is performed at 100Hz.*
- ✓ Under "Calibrate Cameras" Click "Show Advanced",

Wand: Select "Active Wand V2"

1.1.2 The Calibration Wand Orientation:

- *Positive X axis is identified by the far left marker as you look at the wand.*
- *Positive Y axis is identified by the marker closet to the handle.*
- *The origin marker is the point where the X and Y markers connect.*
- *The on and off switch is located next to the origin marker.*

1.2 Aim the 8 Cameras

1.2.1 Make sure you have the correct view option selected

- ✓ Window -> Options -> Droop down menu "Target Treadmill"

1.2.2 Place the Calibration Wand in the center of your measurement volume & turn on.

1.2.3 Select all cameras;

Under the "Vicon Cameras" click on camera # 1 and drag to camera # 8

1.2.4 On the top left of the camera display box

Change "3D Perspective" to "Camera"

& in the "View" drop box select "3D Overlay"

1.2.4 <u>Make sure you are in the System Preparation</u>

- Right hand side under "Tools" click the preparation logo

1.2.5 Under the "Aim Camera", click "Start"

1.2.5.1 Carefully adjust the cameras in order to optimize your measurement volume.

- **USE TWO HANDS** one on the set screw, second hand must maintain control of camera.
- Keep in mind the error associated with cameras pointing at each other.
- It is helpful to only have one camera display open, to close a camera display click the x on the top right of display window.

1.2.6 Click "Stop"

1.2.7 Turn off wand

1.3 Masking Cameras

- *Masking is preventing a specific area or set of pixels on the camera from collecting data.*
- *Keep in mind that Masking is making a "dead spot" in the camera view; avoid masking in the measurement volume.*
- *Making must be done for unmovable reflections or other camera strobes that interfere with the system of cameras.*

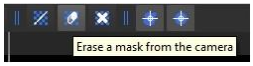
1.3.1 Select all cameras by clicking on camera #1 and dragging to camera # 8.

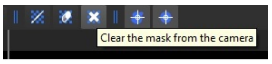
1.3.2 On the Right side→ Mask camera tab → Click start
(Reflections change color when they are masked)

1.3.3 Click Stop after all unwanted reflections are masked.

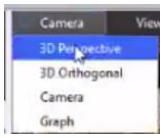
1.3.3.1 You can manually mask cameras if needed

- Select a camera that has a reflection that needs to be masked
- Zoom in by Right clicking and moving the mouse forward/backward
- Hold both mouse buttons and move the mouse to center onto the reflection
- Next to "View" on the top left of the video box use
- "Pant a mask on the Camera" & "Erase a mask from the camera"
- Click "X" to clear the all the masks of a camera if needed.





2 Calibration



2.1 Make sure you're on "Camera" perspective.

2.2 <u>Default setting should be</u>

✓ In "Tools" under "Calibrate Cameras" Click "Show advanced"

✓ Select "Full calibration"

✓ Select "All cameras"

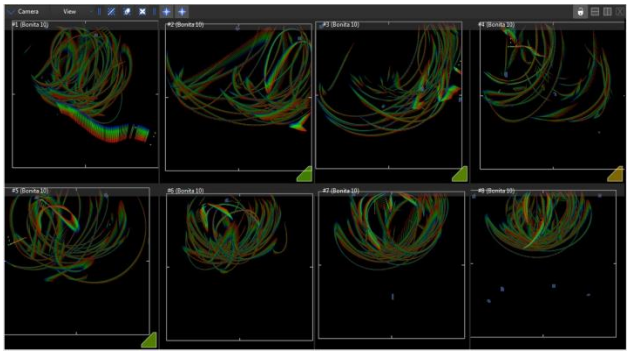
✓ Set "Refinement Frames" to 2000.

2.3 With the wand on, stand in the measurement volume.

2.4 Click Start

Move calibration wand around the measurement volume & surrounding area trying to keep all LED lights facing at least 2 cameras at the same time.

The goal is to evenly cover each camera's display box with the RANBOW :



Each camera has a tringle in the lower right corner of the respective box.

As the camera approaches 2000 captured frames the triangle approaches green and goes away after 2000 frames are captured.

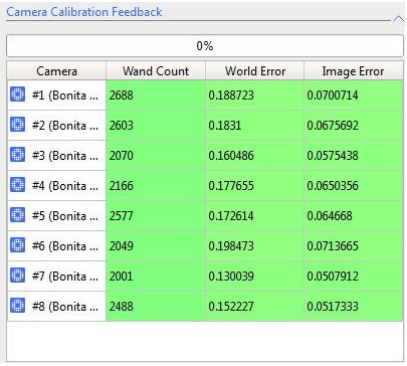
Calibration automatically ends when the last Camera captures 2000 frames of the 5 marker wand.

- *Calibration is done at 100Hz (100 frames a sec) not 200Hz (frame rate for data collection) in order to lengthen the overall time of the calibration and increase the volume covered by the wand.*

2.5 Check the quality of the calibration

2.5.1 Under the "Camera Calibration Feedback"

2.5.2 Image Error should be less than 0.1 or the calibration should be repeated



Camera	Wand Count	World Error	Image Error
#1 (Bonita ...	2688	0.188723	0.0700714
#2 (Bonita ...	2603	0.1831	0.0675692
#3 (Bonita ...	2070	0.160486	0.0575438
#4 (Bonita ...	2166	0.177655	0.0650356
#5 (Bonita ...	2577	0.172614	0.064668
#6 (Bonita ...	2049	0.198473	0.0713665
#7 (Bonita ...	2001	0.130039	0.0507912
#8 (Bonita ...	2488	0.152227	0.0517333

3 Set the Volume Origin

3.1 Place the wand in the center of the measurement volume & turn on

Keep in mind the positive X and Y axis orientation of the wand (1.1.2)

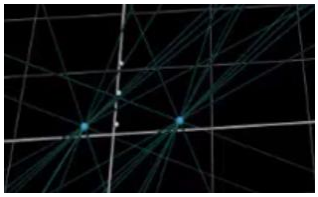
3.2 Change the Camera perspective from "Camera" to "3D Perspective"

3.3 <u>Default setting should be</u>

✓ Under "Set Volume Origin" → Show advanced → L-Frame: Active Wand v2 →

3.4 Click “Start”,
3.5 Click “Set Origin”.

You should see the system of the cameras orientate about the origin LED (marker) of the wand.



3.5.1 To visualize the system’s error:

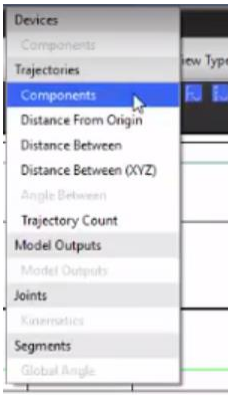
Select the positive X axis marker

Hold control & select the negative X axis marker

Split the screen

Change the 2nd camera perspective from 3D to Graph

Change the graph from “Components” to “Distance Between”



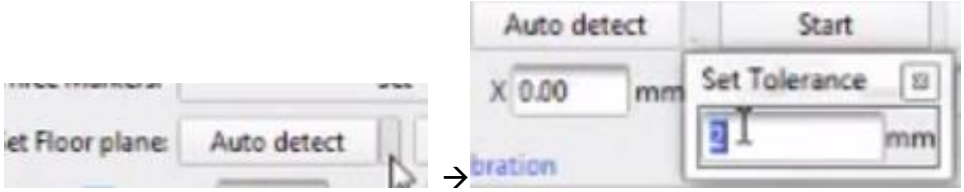
You can stop the graph by pressing the space bar

Markers are 240mm apart; check to see of the graph is close

3.6 Level the Measurement Volume

3.6.1 Turn off the wand
3.6.2 Place 4 markers on each corner of the treadmill
- *Or the surface you would like to level*

3.6.3 Under “Set volume origin” → Select “Auto detect” with Tolerance at 2mm.



The offset should be -6.5mm in the Z axis.